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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/619,975	07/15/2003	Byron Vencent Bell	2001-0699.07	7828
21972	7590	04/16/2004	EXAMINER	
LEXMARK INTERNATIONAL, INC. INTELLECTUAL PROPERTY LAW DEPARTMENT 740 WEST NEW CIRCLE ROAD BLDG. 082-1 LEXINGTON, KY 40550-0999			BROOKE, MICHAEL S	
			ART UNIT	PAPER NUMBER
			2853	

DATE MAILED: 04/16/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

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<b>Office Action Summary</b>	<b>Application No.</b> 10/619,975	<b>Applicant(s)</b> BELL ET AL.	
	<b>Examiner</b> Michael S. Brooke	<b>Art Unit</b> 2853	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-25 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>12/09/03</u> . | 6) <input type="checkbox"/> Other: ____.  |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 1-3, 5-7, 21, 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ikeda et al. (4,567,493) in view of Yaegashi et al. (5,270,370).**

Ikeda et al. teaches an ink jet print head comprising:

- A housing (Fig. 6) having a heater chip (211) formed thereon. The housing comprises a supply of ink (308) and the heater chip has an ink via (305) in fluidic access with the ink supply.
- A substrate (205).
- A thermal barrier layer (206) made of SiO<sub>2</sub> and having a thickness of 5 microns (col. 7:48-49).
- A resistor layer (207) having a width, a thickness and a length, wherein the resistor is made of HfB<sub>2</sub> (col. 6:6-51) and has a thickness of 10 angstroms (col. 6:67-68).
- A conductor layer (204), having an anode and a cathode, is provided on the resistor layer and defines a heater length.

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- A first protective layer (208) made of SiN and having a thickness of 1000 angstroms, functions as a passivation layer (col. 4:25-26).
- A third protection layer (210) made of Ta and having a thickness of 100 angstroms, functions as a cavitation layer (col. 6:12).

Thus, the thickness of the resistor and the protective layer equals 1110, which is about 1000 angstroms. Ikeda is silent with regard to the area of the heater

Ikeda et al. teaches the claimed invention with the exception of the heater having an area of from about 50 to about 100 sq. microns, about 100 to about 150 sq. microns about 150 to about 200 sq. microns, about 200 to about 250 sq. microns, about 250 to about 300 sq. microns, about 300 to about 350 sq. microns, and about 350 to about 400 sq. microns.

Yaegashi teaches that is notoriously old and well known in the ink jet that a heater having an area of 100 to 30,000 sq. microns is a suitable size for providing good discharge characteristics (col. 12:40-43).

It would have been obvious to one of ordinary skill in the ink jet art at the time the invention was made to have provided Ikeda et al. with a heating resistor with an area of about 50 to about 100 sq. microns, about 100 to about 150 sq. microns and about 150 to about 200 sq. microns, for the purpose of providing good discharge characteristics, as taught by Yaegashi.

**Claims 21 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ikeda et al. (4,567,493) in view of Eida et al. (4,338,611).**

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Ikeda teaches the claimed invention, as above, with the exception of a heating resistor with an area of about 200 to about 250 sq. microns, about 250 to about 300 sq. microns, about 300 to about 350 sq. microns, and about 350 to about 400 sq. microns.

Eida et al. teaches an ink jet print head having a heater made of  $\text{HfB}_2$  and an area that ranges from 250 sq. microns (Table 1, example 5) to 400 sq. microns (see Table 1, example 11). Using a heater with this area provides the advantages of high frequency recording, stability of the discharging direction and prevention of satellite drops (col. 6:33-45).

It would have been obvious to one of ordinary skill in the ink jet art at the time the invention was made to have provided Ikeda et al. with a heating resistor with an area of 250 to 400 sq. microns, for the purpose of improving recording frequency, improving the stability of the discharge direction and preventing satellite drops, as taught by Eida et al.

**Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ikeda et al. (4,567,493) in view of Yaegashi et al. (5,270,370), as applied to claims 1-3, 5-7, 21, 24 above, and further in view of Hanson (4,635,073).**

Ikeda et al., as modified, teaches the claimed invention with the exception of a TAB circuit electrically connected to a bond pad on the heater chip.

Hanson teaches (Fig. 1a) a TAB circuit (16) which is electrically connected to the bond pads of the heater chip in order to supply an electric signal. The use of the TAB circuit allows for the size of the substrate to be reduced (col. 1:40-46).

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It would have been obvious to one of ordinary skill in the ink jet art at the time the invention was made to have provided Ikeda et al., as modified, with a TAB circuit for the purpose of reducing the size of the substrate, as taught by Hanson.

### ***Double Patenting***

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

**Claims 1-7 and 9-25 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-20 of copending Application No. 10/620,197 in view of Ikeda et al. (4,567,493).**

Claims 1 and 6 of '975 is taught by claims 1-4, 9, 11, 13, 15 and 16 of '197, with the exception of a thermal barrier layer.

Claim 2 of '975 is taught by claims 1-4, 9, 11, 13, 15, 16 and 17 of '197.

Claim 3, of '975 is taught by claims 1-4, 9, 11, 13, 15, 16, 17 and 18 of '197.

Claim 4 of '975 is taught by claims 1-4, 9, 11, 13, 15, 16 and 12 of '197.

Claim 5 of '975 is taught by claims 1-4, 9, 11, 13, 15 and 16 of '197, with the exception of the thermal barrier layer thickness being at least 1 micron.

Claim 7 of '975 is taught by claims 1-4, 9, 11, 13, 15 and 16 of '197, with the exception of the housing comprising a supply of ink and the heater chip having an ink via in fluidic access the supply.

Claim 9 of '975 is taught by claims 1-4, 9, 11, 13, 15 and 16 of '197, with the exception of a carriage. The Examiner takes Official Notice that it is notoriously old and well known in the ink jet art to provide carriage for scanning the print head across a recording medium.

Claim 10 of '975 is taught by claims 1-4, 9, 11, 13, 15 and 16 of '197, with the exception of the ink supply being locally configured with a housing of the print head.

Claim 11 of '975 is taught by claims 1-4, 9, 11-13, 15 and 16 '197, with the exception of a thermal barrier layer.

Claim 12, of '975 is taught by claims 1-4, 9, 11-13, 15, 16 and 18 of '197.

Claim 13, of '975 is taught by claims 1-4, 9, 11-13, 15, 16 and 14 of '197.

Claim 14, of '975 is taught by claims 1-4, 9, 11-13, 15 and 16 '197, with the exception of the cavitation layer being made of Ta.

Claim 15, of '975 is taught by claims 1-4, 9, 11-13, 15 and 16 of '197, with the exception of the cavitation layer being made of hafnium boride.

Claim 16 of '975 is taught by claims 1-4, 9, 11-13 and 15-17 of '197, with the exception of a thermal barrier layer.

Claim 17 of '975 is taught by claims 1-4, 9, 11-13, 15 and 16 of '197, with the exception of a thermal barrier layer.

Claim 18 of '975 is taught by claims 1-4, 9, 11-13 and 15-17 of '197.

Claim 19 of '975 is taught by claims 1-4, 9, 11-13, 15, 16 and 18 of '197.

Claim 20 of '975 is taught by claims 1-4, 9, 11-13, 15, 16 and 18 '197, with the exception of a thermal barrier layer being at least 1 micron thick.

Claims 21-23 and 25 of '975 is taught by claims 1-7 of '197, with the exception of a thermal barrier layer.

Claim 24 '975 is taught by claims 1-7 of '197, with the exception of a thermal barrier layer.

Ikeda teaches a thermal barrier layer having a thickness of 5 microns. This layer is used to control the conduction of heat, generated by the heaters to the substrate. (col. 6:27-42). Ikeda further teaches that it is well known in the ink jet art to provide a housing comprising a supply of ink and the heater chip having an ink via in fluidic access the supply (Fig. 5), in order to provide ink to the heater chip. A heater that is made of hafnium boride is provided and provides excellent ejection properties (col. 6:52-55). Finally, a cavitation made of Ta is provided to enhance liquid resistance and reinforce mechanical strength (col. 5:42-50).

It would have been obvious to one of ordinary skill in the ink jet art at the time the invention was made to have provided the claims of '975, with a thermal barrier layer, a housing having an ink supply and ink via, a heater made of hafnium boride and a Ta cavitation layer, as taught by Ikeda, for the purposes disclosed above.



**Claim 8 is provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-4, 9, 11, 13, 15 and 16 of copending Application No. 10/620,197 in view of Ikeda et al. (4,567,493) and Hanson (4,635,073).**

The claims of '197, as modified, teach the claimed invention, as above, with the exception of a TAB circuit electrically connected to a bond pad on the heater chip.

Hanson teaches (Fig. 1a) a TAB circuit (16) which is electrically connected to the bond pads of the heater chip in order to supply an electric signal. The use of the TAB circuit allows for the size of the substrate to be reduced (col. 1:40-46).

It would have been obvious to one of ordinary skill in the ink jet art at the time the invention was made to have provided the claims of '197, as modified, with a TAB circuit for the purpose of reducing the size of the substrate, as taught by Hanson.

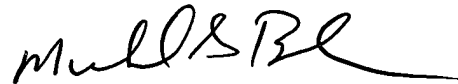
This is a provisional obviousness-type double patenting rejection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael S. Brooke whose telephone number is (571) 272-2142. The examiner can normally be reached on M-F from 5:30 AM-2:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen D. Meier can be reached on (571) 272-2149. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read "Michael S. Brooke", with a long horizontal flourish extending to the right.

Michael S. Brooke  
Primary Examiner  
Art Unit 2853

MSB  
040804